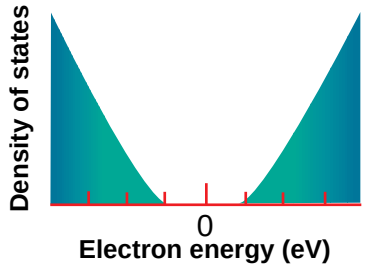
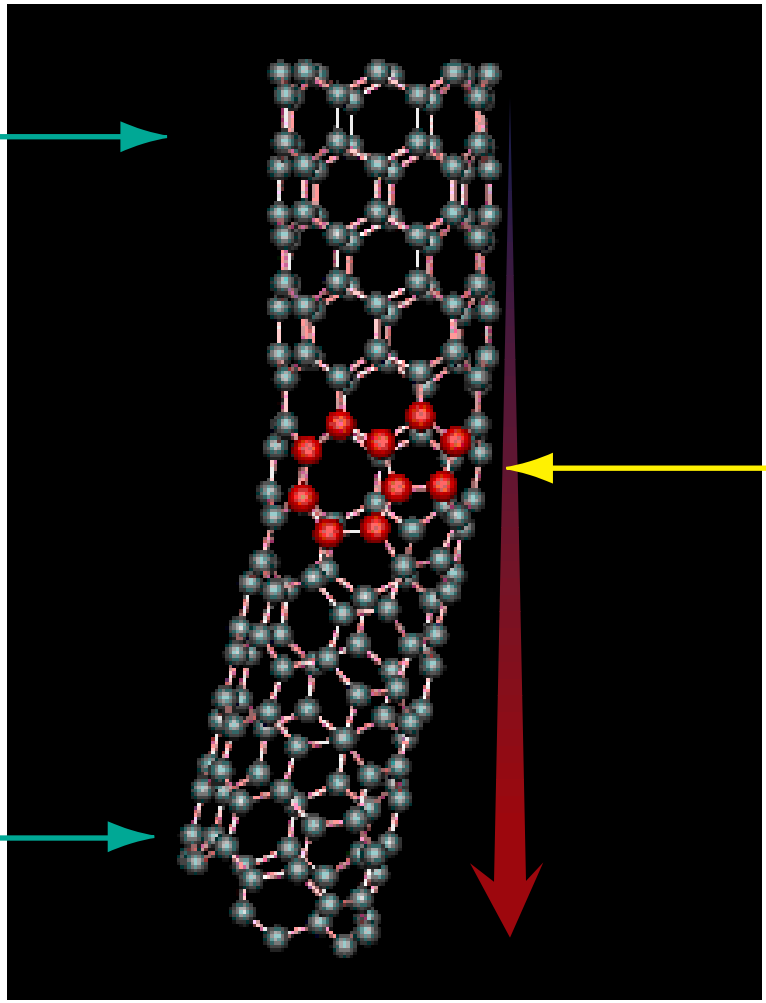
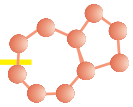
Design for "Nanotube Diodes" Proposed

Theory Predicts How Structure of Tubes Affects Electronic Properties

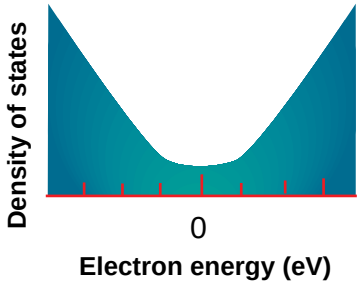


Theory predicts no states at zero electron energy for nanotubes formed by "even" rolling of graphite hexagons. This "gap" indicates semiconducting behavior. Experimental measurements of tubes confirms prediction.





The calculations show that the two types of tubes can be joined tightly with pairs of five and seven membered rings.



Theory predicts no "gap" for nanotubes formed by "spiral" rolling of graphite hexagons. This indicates metallic behavior.

"Hybrid" nanotube predicted to function as diode—current can flow only from semiconducting top to metallic bottom.

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